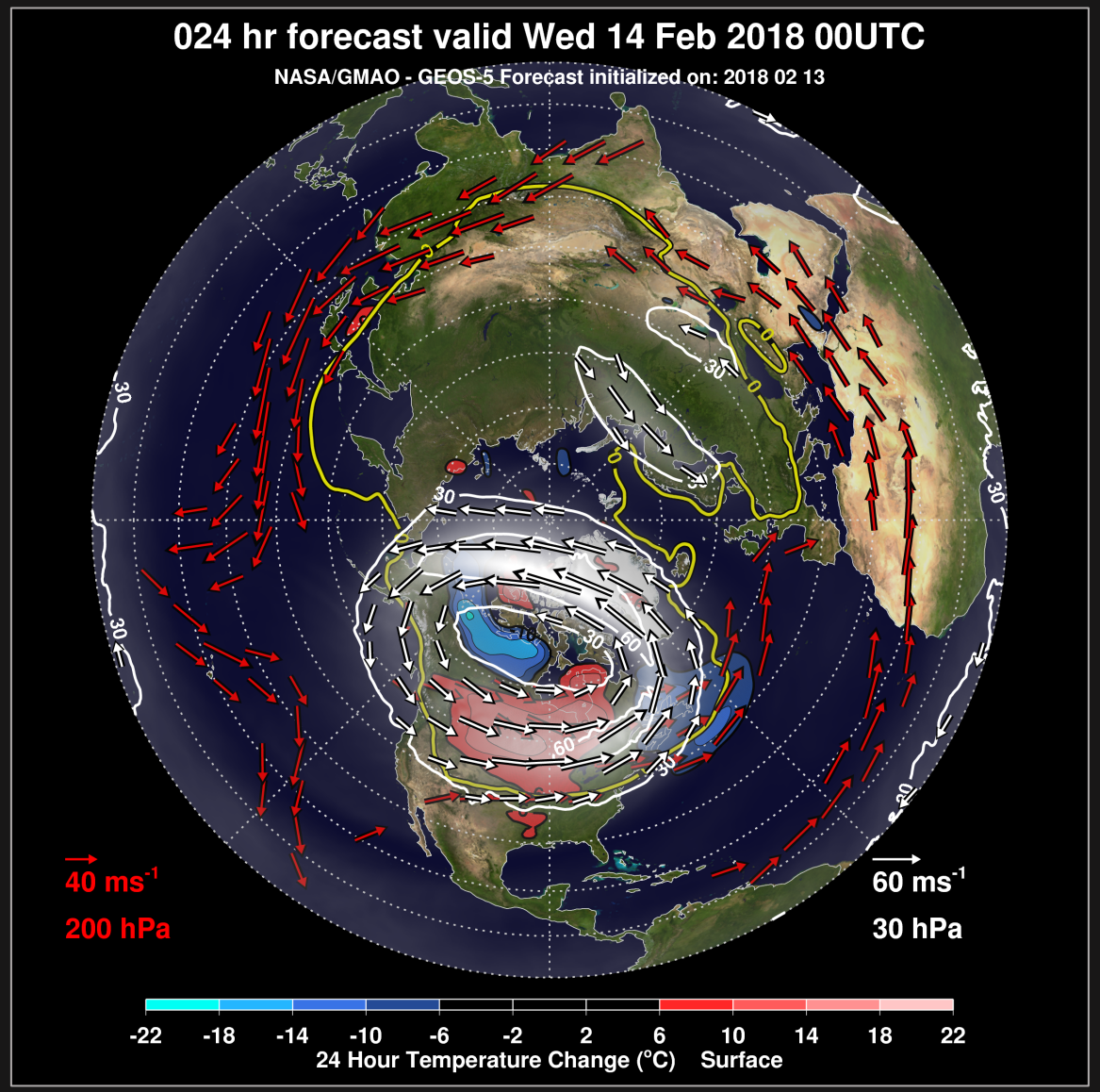

Active Winter Weather Forecasted Over North America Follow a Major Stratospheric Sudden Warming Event

In mid February 2018, the stratosphere experienced a major stratospheric sudden warming (SSW) event, in which the polar vortex has split into two pieces as warm air flowed into the polar cap. It is known that some SSW events are associated with surface weather changes. In this case, both stratosphere and troposphere features appear to be evolving together, with large day-to-day changes in surface temperature occurring under the larger piece of the polar vortex that is located over North America.

This image shows the 24-hour forecast valid on February 14, 2018. The lower stratospheric winds are denoted by the white contours and white wind vectors, highlighting that the main stratospheric polar vortex is centered over North America, while the weaker second part of the polar vortex is over Europe. Surface weather systems are denoted by the filled red and blue contours, that depict 24-hour increases and decreases in surface temperature between February 13 and February 14. These patterns show changes of more that 10C in surface changes, associated with air masses circulating around the deep vortex – these patterns are largely absent over Europe and Asia.

These features persist in the full 10-day forecast shown in the accompanying animation at:
https://gmao.gsfc.nasa.gov/research/science_snapshots/anim/fcst_30mb_sfc_2018021300.mp4